



Comorbidities, Infections, and Mortalities of COVID-19 in Bangladesh During May-June 2021

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Abstract

Background: COVID-19 is the serious ruin of the current century that emaciated health, economy, and everyday life.

Objectives: This research assessed the condition and relation of tests, infections, recoveries, and deaths of SARS-CoV-2 from May 1 to June 30, 2021.

Methods: The research plan was carried out from May 1 to June 30, 2021 (N = 61 days) to state the position of Bangladesh towards widespread COVID-19. The information in this study was obtained from different government organizations.

Results: The total cases, infections, recoveries, and deaths were 1100361, 149576, 136159, and 2864, respectively, during the study period. In May 2021, the total number of COVID-19 tests, infections, recoveries, and deaths was 439111, 36858, 49147, and 975, respectively. In June 2021, the total number of COVID-19 tests, infections, recoveries, and deaths was 661250, 112718, 87012, and 1889, respectively. The maximum number of COVID-19 infections was 1914 on May 4, recoveries 3870 on May 4, and deaths 69 on May 2. The minimum number of COVID-19 infections was 261 on May 15, recoveries 601 on May 16, and deaths 17 on May 26. The maximum number of COVID-19 infections was 8822, and recoveries were 4550 on June 30, while deaths were 119 on June 27. The minimum number of COVID-19 infections was 1447, and recoveries were 1667 on June 5, while deaths were 30 on June 3 and 7. In May and June, a positive correlation was observed between the tests and infections, recoveries, and deaths, and a negative relationship was found between a date with daily tests of COVID-19 ($R^2 = 0.8359, 0.2147, 0.1424, \text{ and } 0.0035$ and $R^2 = 0.6016, 1, 1, \text{ and } 0.6488$). At the 0.01 level of two-tailed Spearman, the relationships were positive and moderate to strong. The Spearman relationship for infections, recoveries, and deaths was 0.606, 0.756, 0.689, and 0.736. This research additionally showed a moderate to strong relationship between tests, infections, recoveries, and deaths of SARS-CoV-2.

Conclusions: COVID-19 has spread rapidly to 64 districts in Bangladesh. The continuing occurrence of COVID-19 infections has emphasized the importance of the quick and developed 118 laboratory diagnoses to limit its spread. In this situation, people should avoid public gatherings as much as possible and return home as soon as possible after finishing work.

Keywords: COVID-19, SARS-CoV-2, Tests, Infections, Recoveries, Deaths, Relationship, Regression, Bangladesh

1. Background

Human infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus causing the respiratory disease COVID-19, was first noticed in China in the last month of the year 2019 (1). It was noticeably identical (88%) to two bat-derived SARS-like coronaviruses and additionally similar to SARS-CoV (79%) and MERS-CoV (50%) (2).

It is an infectious epidemic that has infected over 200 nations worldwide. It has spread to several nations and is now recognized as a global epidemic (3). On January 30, 2020, the WHO stated this serious outbreak as a public health emergency of international concern, and it became a pandemic on March 11 (4). The highly contagious disease has spread to more than 215 countries, infecting 140.3 million people and killing more than three million

(5). More than 80.3 million cases and 1.77 million related deaths were stated worldwide at the end of 2020 (6). In March 2021, the pandemic rapidly swept the globe, infecting more than 122 million people, and more than 2.69 million people died. In Bangladesh, the first case of COVID-19 was detected on March 8, 2020. Three people were confirmed with COVID-19 on March 8, 2020 (7). It reached 100 cases on April 9, 2020, and exceeded 200 cases (case doubling time) within the next two days. As of October 12, 2020, there were 379738 confirmed cases, including 5555 deaths, with the case fatality and recovery rates of 1.85% and 77.5%, respectively. The virus has swiftly spread across Bangladesh, infecting over 962,000 individuals, reviving over 475000 people, and killing over 8000 people (8).

On March 26, the shutdown was proclaimed for the first time (9). The second lockdown was implemented on April 14, 2021. In April 2021, there were lockdowns in eight divisions, 64 districts, and 492 Upazilas. The government proclaimed the third lockdown, which began on July 1, 2021. It was a particularly difficult lockdown, with the police, RAB, and army patrolling under severe lockdown. On July 21, Muslims celebrated Eid, a big holy holiday in which peasants from various major areas were taken to their homes. Following Eid, a tight lockdown was reinstated on July 23. The Prime Minister of Bangladesh announced an incentive of Tk 3,200 crore to help low-income people affected by the lockdown. The business activity was found to be impacted due to disease (10). The local farmers faced several issues in collecting and reaping the rice, crops, and fruits because the labor value was high; but the merchandise value declined (11). The government has taken frequent steps to overcome the prevalence and stop all the political issues and cultural gatherings (12).

In a pandemic situation, the COVID-19 tests, infections, and deaths gradually increased daily in Bangladesh. In June, the Global Humanitarian Overview documented more than 10,185,374 new cases and 503,862 fatalities, representing a 21% rise in cases and a 32% increase in deaths compared to March (13). From May to June 2021, COVID-19 tests, infections, recoveries, and mortalities rose, reaching 1100361, 149576, 136159, and 2864 in Bangladesh. The coronavirus cases grew after the new stain was acquired in late April 2021, but it became more dangerous in June. Developing the new Stein has a horrible effect but the person who has affected lives in the community made it more difficult. A seven-day lockdown was instituted on June 1, which was extended to deal with the problem. The present study describes the status of tests, infections, recoveries, and fatali-

ties in Bangladesh from May 1 to June 30, 2021.

2. Objectives

We assessed the present condition of Bangladesh and the status of tests, infections, recoveries, and deaths of COVID-19 in Bangladesh from May 1 to June 30, 2021.

3. Methods

3.1. Study Design and Period

COVID-19 was confirmed in Bangladesh on March 8, 2020. We collected publicly shared daily data from the websites DGHS (14) and IEDCR (15). The data collection period was from May to June 2021 (N = 61 days).

3.2. Tests of COVID-19

There are two types of tests: (A) Diagnostic (virus) test on bronchial samples (nasal samples). It remains to be seen whether a human has COVID-19 at the moment. (B) Antibody tests: in the past, COVID-19 was tested to determine if it was present.

3.3. Data Retrieval

This study included patients with tests, infections, recoveries, and deaths of COVID-19 based on a positive result of the SARS-CoV-2 test by official websites of IEDCR, DGHS, and MoHFW. Data were acquired from various medical units in Bangladesh states, including 59 different institutions that comprise the Bangladesh health system.

3.4. Code of Ethics

All the data are real, and those data collected from governmental websites, local newspapers, internet news sites, and social networks were cross-checked (16, 17).

3.5. Equation

The following formula was used to observe the percentage of deaths in Bangladesh during the study period.

$$\text{Death (\%)} = \frac{\text{Death}}{\text{Total death}} \times 100$$

3.6. Statistical Analysis

All obtained data were double-checked, coded, and entered into a database with Microsoft Excel 2016. In May and June 2021, the regression was calculated. The Spearman rank correlation compared the correlation of two variables, and statistical significance was accepted at p values of 0.01, 0.05, and 0.1. SPSS version 25.0 (USA) was used to perform all statistical analyses.

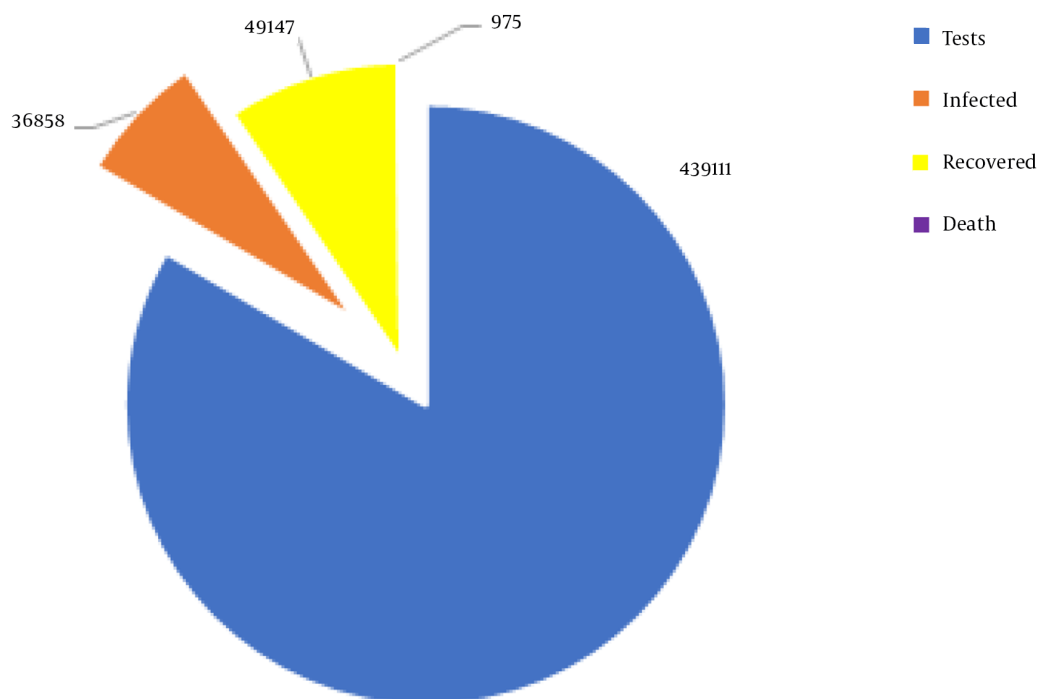


Figure 1. Total number of coronavirus tests, infections, recoveries, and deaths in Bangladesh

4. Results

4.1. The Coronavirus Update in Bangladesh from May to June 2021

On March 8, 2020, three people in Bangladesh were verified to have COVID-19. Since then, tests, infections, and deaths have steadily increased. Figure 1 depicts the overall number of infections, recoveries, and deaths. The overall number of COVID-19 tests, infections, recoveries, and deaths in May 2021 was 439111, 36858, 49147, and 975, respectively. The total number of COVID-19 tests, infections, recoveries, and deaths in June 2021 was 661250, 112718, 87012, and 1889, respectively.

On May 25, the most COVID-19 tests were performed as 26624 tests; 1,914 were infected on May 4; 3,870 recovered on May 4, and 69 died on May 2. On May 15, the minimum number of COVID-19 tests was 3758; on May 16, the infection number was 261; on May 16, the recovery number was 601; and on May 26, the death rate was 17 (Figure 2). The most COVID-19 tests were 35,105 on June 30; the most infections were 8,822 on June 30; the most recoveries were 4,550 on June 30, and the most deaths were 119 on June 27. On June 12, the minimum number of COVID-19 tests was 11,590; on

June 5, 1447 people were infected; on June 5, 1667 people recovered; and 30 persons died on June 3 and 7 (Figure 3). The COVID-19 mortality rate varied from 5.90 to 3.22 and 6.30 to 3.30 in May and June 2021, respectively, in Bangladesh (Figure 4).

4.2. Spearman's Rho Correlation Analysis Among Tests, Infections, Recoveries, and Deaths of COVID-19

Spearman's rank-order correlation investigated the association between variables (tests, infections, recoveries, and deaths) in Bangladesh. Variables were determined to have statistically significant correlations. At the 0.01 level in two-tailed analysis, the results demonstrated a positive, moderate to strong correlation between the variables (Table 1).

Tests: The results revealed a moderate relationship between tests and infections ($r_s = 0.888$), recoveries ($r_s = 0.626$), and deaths ($r_s = 0.668$) of COVID-19. **Infections:** The results revealed a moderate to strong relationship between infections and tests ($r_s = 0.888$), recoveries ($r_s = 0.640$), and deaths ($r_s = 0.739$) of COVID-19. **Recoveries:** The results revealed a moderate to strong relationship between recoveries and tests ($r_s = 0.626$), infections ($r_s =$

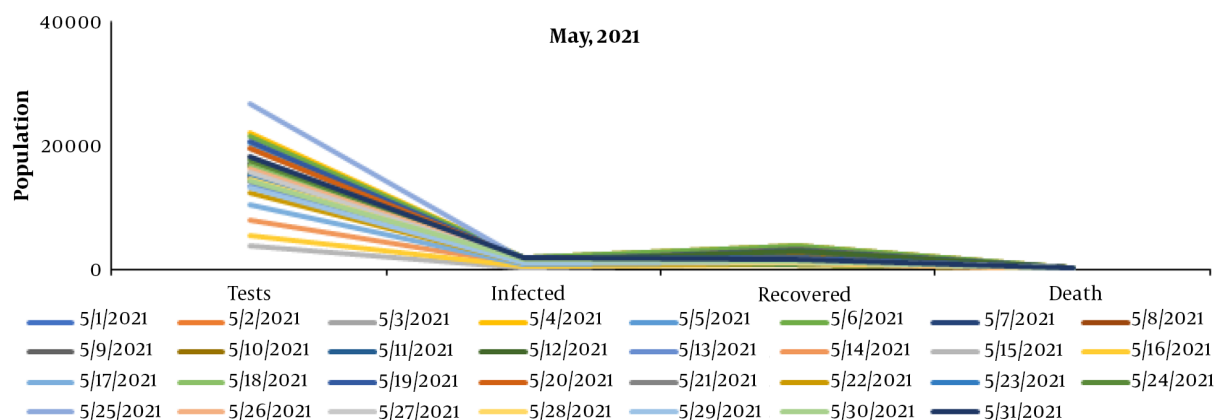


Figure 2. Novel coronavirus update in Bangladesh (tests, infections, recoveries, and deaths)

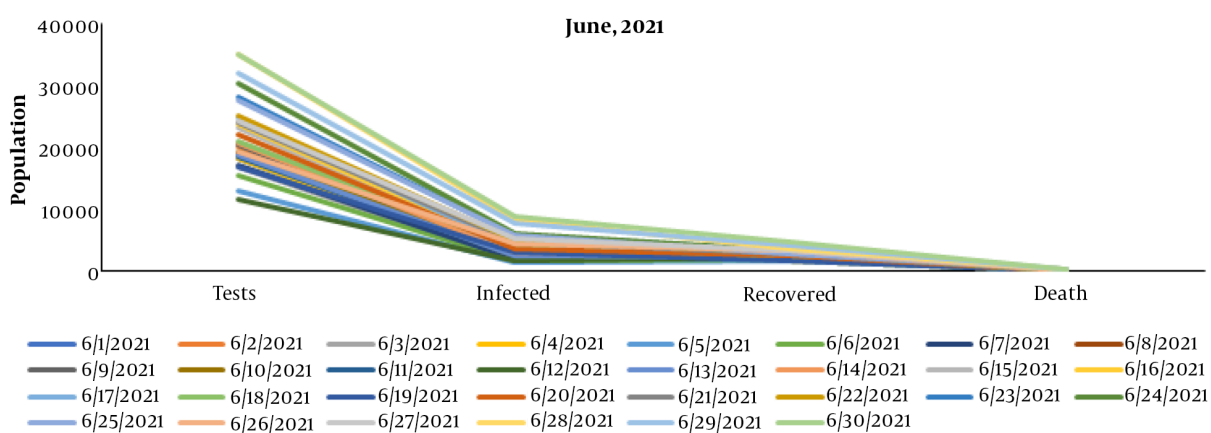


Figure 3. Novel coronavirus update in Bangladesh (tests, infections, recoveries, and deaths)

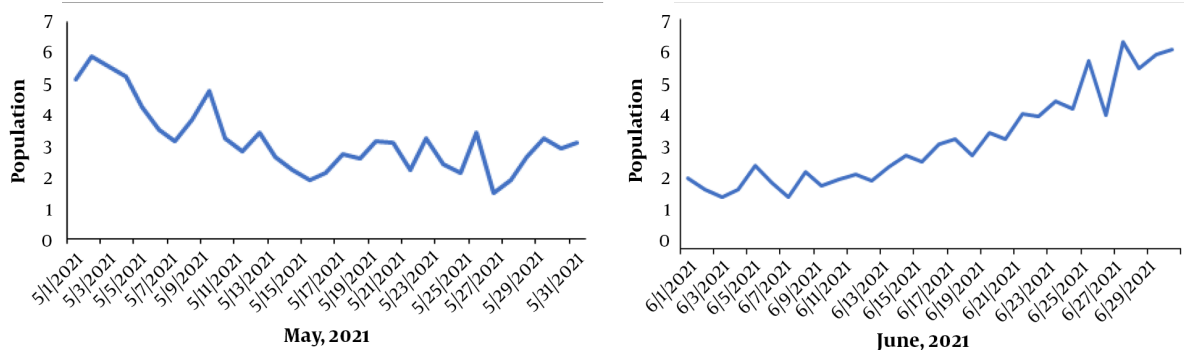


Figure 4. The mortality rate of COVID-19 in May - June 2021 in Bangladesh

Table 1. Spearman's Rho Correlation Analysis Among Tests, Infections, Recoveries, and Deaths of COVID-19 in Bangladesh (N = 61)

	Spearman's Rho Correlations			
	Tests	Infections	Recoveries	Deaths
Tests				
Correlation coefficient	1.000	0.888 ^a	0.626 ^a	0.668 ^a
Significance	-	0.000	0.000	0.000
Infections				
Correlation coefficient	0.888 ^a	1.000	0.640 ^a	0.739 ^a
Significance	0.000	-	0.000	0.000
Recoveries				
Correlation coefficient	0.626 ^a	0.640 ^a	1.000	0.802 ^a
Significance	0.000	0.000	-	0.000
Deaths				
Correlation coefficient	0.668 ^a	0.739 ^a	0.802 ^a	1.000
Significance	0.000	0.000	0.000	-

^a Correlation is significant at the 0.01 level (2-tailed).

0.640), and deaths ($r_s = 0.802$) of COVID-19. Deaths: The results revealed a moderate to strong relationship between deaths and tests ($r_s = 0.668$), infections ($r_s = 0.739$), and recoveries ($r_s = 0.802$) of COVID-19. Before calculating r_s , a visual inspection of the scatterplot of tests, infections, recoveries, and deaths confirmed that the relationship between these variables was non-linear and monotonic.

4.3. Correlation Between Tests, Infections, Recoveries, and Deaths of COVID-19

In May 2021, the most significant number of persons died and were infected with COVID-19 (69 and 1,914 persons). In Bangladesh, the overall number of tests, infections, recoveries, and deaths exceeded 439000, 36000, 49000, and 950, respectively (Table 2 and Figure 5). In May, a positive correlation was observed between the test and infections, recoveries, and deaths, and a negative relationship was found between dates and daily tests of COVID-19 in Bangladesh. It was evident that the positive and negative equations were $y=0.0753x+149.6$, $0.103x+277.88$, $0.0011x+21.081$, and $y=-30.61x+1E+06$, giving an excellent fit to the data. The coefficients of determination $R^2=0.8359$, 0.2147 , 0.1424 , and 0.0035 fitted regression line and had a significant regression coefficient without tests and dates.

In June 2021, the maximum number of deaths and infections of COVID-19 were reported (119 and 8,822 cases). The total number of tests, infections, recoveries, and deaths exceeded 6162000, 112000, 87000, and 1850 in

Bangladesh. A correlation study established the relationship between infections, recoveries, and deaths by COVID-19 (Table 2 and Figure 5). In June, a positive correlation was observed between tests and infections, recoveries, and deaths and dates and tests of COVID-19 in Bangladesh. It was evident that the positive equation was $y=517.73x-2E+07$, x , x , and $0.0038x-20.454$, giving a good fit to the data. The coefficients of determination $R^2=0.6016$, 1 , and 0.6488 fitted regression line and had a significant and non-significant regression coefficient without deaths and infections.

5. Discussion

COVID-19 is an infectious disease caused by severe acute respiratory syndrome coronavirus. The COVID-19 virus feasts mainly when an infected one is in close contact with another one (18). Day by day, the coronavirus has taken different shapes, and the epidemic has occurred in new places. It has affected the agricultural sector (19). In May 2021, total tests, infections, recoveries, and deaths were 439111, 36858, 49147, and 975, respectively. In June 2021, total tests, infections, recoveries, and deaths were 661250, 112718, 87012, and 1889, respectively. Similar results were observed from March 8, 2020, to April 30, 2021, where overall tests, infections, recoveries, and deaths were 5345294, 668315, 746161, and 13220, respectively, in Bangladesh (20). The maximum number of COVID-19 infections was 8822 on

Table 2. The Relationships Between Tests, Infections, Recoveries, and Deaths of COVID-19 During the Study Period

Month/Regression Items	Regression Equation	% Role of Individual Factor	Significant	R ² Value
May				
Date vs. tests	$y = -30.61x + 1E+06$	0.35	0.7519	0.0035
Tests vs. infested	$y = 0.0753x + 149.6$	83.59	NS	0.8359
Tests vs. recovered	$y = 0.103x + 277.88$	21.47	0.0087	0.2147
Tests vs. death	$y = 0.0011x + 21.081$	14.24	0.0364	0.1424
June				
Date vs. tests	$y = 517.73x - 2E+07$	60.16	SN	0.6016
Tests vs. infested	$y = x$	100.00	0.00	1
Tests vs. recovered	$y = x$	100.00	0.00	1
Tests vs. death	$y = 0.0038x - 20.454$	64.88	NS	0.6488

June 30, and deaths were 119 on June 27, whereas the minimum number of COVID-19 infections was 261 on May 15, and deaths were 17 on May 26. The recovery and death rates were 98% and 2% in India (21). In Bangladesh, COVID-19 infection, recovery, and death rates were 17.192%, 22.510%, and 19.884%, and the mortality rate was less than 2% in 2021 (22).

COVID-19 was mutated in Bangladesh and detected in Africa, the UK, and India. In Pakistan, cases and deaths were 820,823 and 17,811 in April (21). The Spearman relationship for tests, infections, recoveries, and deaths was 0.606, 0.756, 0.689, 0.626, and 0.736 in Bangladesh. The tests were dependent on the infestation and the recovery and death depended on the infestation of COVID-19. Similar results were observed by the Spearman correlation. The case study and mortality rated 0.20 and 0.35 (22). Another study also found similar results, and the mean results of Spearman correlation for tests, infections, recoveries, and deaths were 0.31, 0.35, 0.796, and 0.808 in Bangladesh in April (23). In May and June, a positive correlation was observed between the tests and infections, recoveries, and deaths, and a negative relationship was found between dates and daily tests of COVID-19. Similar results were observed in a study, and the results showed a positive correlation between infections and recoveries and a negative relationship between tests and deaths by COVID-19 in Bangladesh in April 2021 (24). Similar findings were observed in the positive correlation between infections and recoveries and deaths in 2020 (25). The virus is significantly transmissible, suggesting that the second wave will become even more dispersed in Bangladesh in 2020 and 2021. The total tests (722,848), infections (128,555), recoveries (150,816), and deaths (2237) were counted in April 2021 (26). The number of infections during the COVID-19 out-

break in Bangladesh indicates the spread of the infection. The government takes the necessary steps to develop appropriate policies, such as absolute social isolation. People should avoid going to public places as much as possible in this scenario. It would be inappropriate to go out unless there is an urgent necessity. If you must go, you must do so after obtaining proper masks and returning home as soon as possible after completing your duties. The government should develop new megaprojects to assist the impoverished to keep coronavirus under control.

5.1. Conclusions

In Bangladesh, COVID-19 has affected 64 districts. The ongoing COVID-19 infection outbreak has underlined the need for early and developed 118 laboratory diagnoses to limit the spread of the disease and effectively treat infected people. In this situation, people should avoid traveling to public places. It would be unacceptable to leave the house unless there is a pressing need. If you must go, do so after getting appropriate masks and coming home as soon as possible once the task is over. To keep coronavirus under control, the government should establish new megaprojects to help the poor.

Footnotes

Authors' Contribution: This work was conducted in collaboration with all authors. AUK planned, structured, wrote, revised, and rechecked the manuscript thoroughly. AUK5 analyzed the research data and revised the manuscript. RA, FUK, SK, BD, and ASF contributed to revising and improving the manuscript thoroughly. All authors

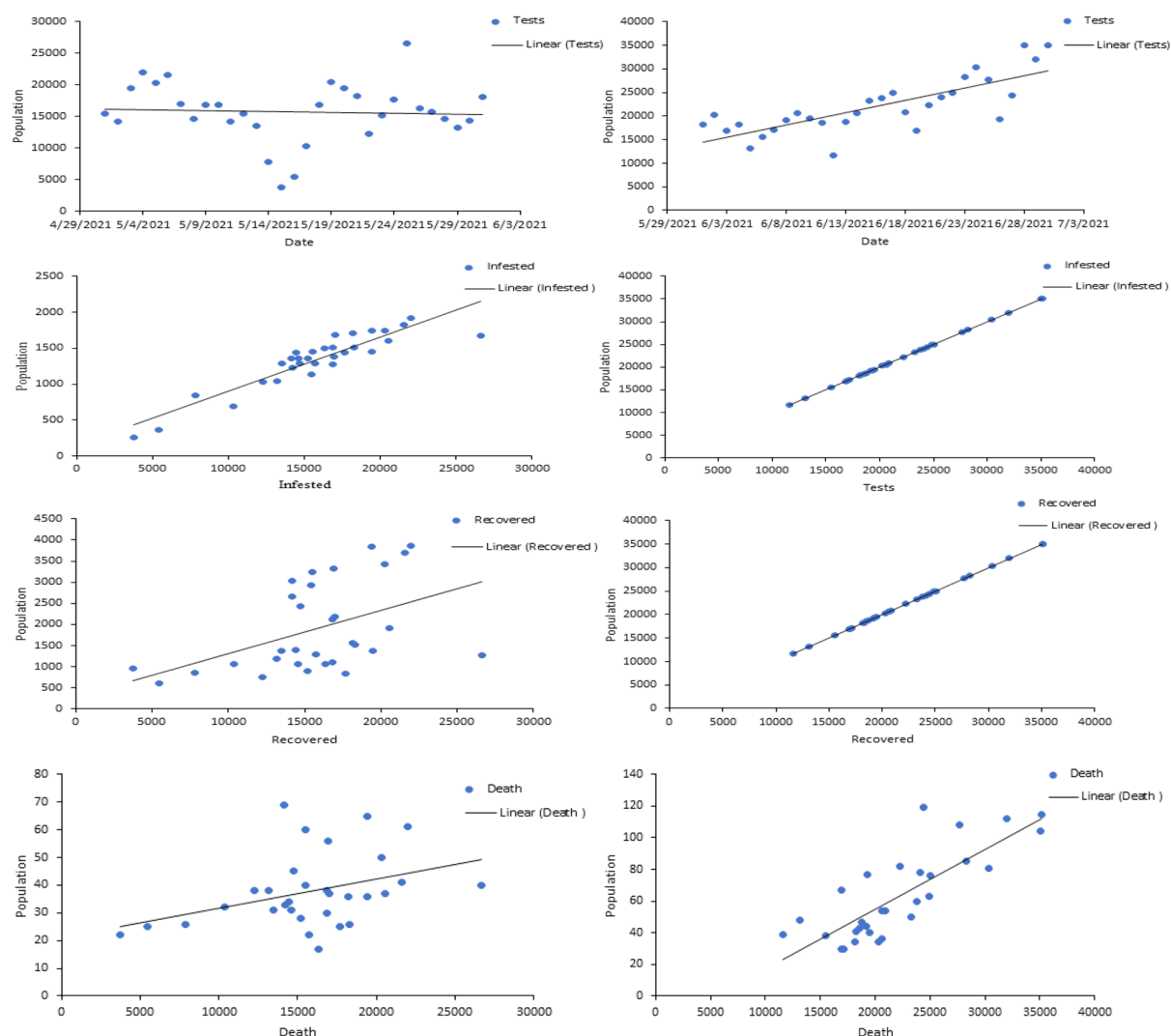


Figure 5. Relationship between dates and tests (first pair) and tests and infections (second pair), recoveries (third pair), and deaths (fourth pair) in Bangladesh.

reviewed carefully and approved the final version of the manuscript.

Clinical Trial Registration Code: <https://ClinicalTrials.gov/NCT00000161>.

Conflict of Interests: The authors declare no conflict of interest.

Ethical Approval: All the authors approved this manuscript.

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